

Claims

[c1] An amplifier redundancy system comprising:

- a first output switch comprising a side port position and a through port position, wherein said first output switch is in said side port position, and wherein said first output switch receives signals amplified in a first amplifier;
- a first input switch comprising a side port position and a through port position, wherein said first input switch is in said side port position, and wherein said first input switch switches to said through port position in response to a failure in a second amplifier,
- said first amplifier receiving signals from said first input switch when said first input switch is in said through port position, said second amplifier receiving signals from said first input switch in said side port position and through a second input switch and generating amplified signals therefrom,
- said second input switch comprising a side port position and a through port position, wherein said second input switch receives signals from said first input switch when said first input switch is in said side port position; and
- a second output switch comprising a side port position and a through port position wherein said second output

switch is in said through port position, and wherein said second output switch switches to said side port position thereby receiving signals through said first amplifier and said first output switch in response to said failure in said second amplifier.

- [c2] The system according to claim 1 further comprising:
 - a third amplifier receiving signals from a third input switch in a side port position through said second input switch in said side port position; and
 - a third output switch receiving signals from said third amplifier when said third output switch is in a through port position.
- [c3] The system according to claim 2 further comprising a second redundant amplifier activated in response to failure of said third amplifier.
- [c4] The system according to claim 1, further comprising a controller controlling operations of said first input switch, said second input switch, said first output switch, and said second output switch.
- [c5] The system according to claim 1 further comprising a controller adjusting amplifier drain voltage in response to a degradation in noise power ratio as a function of operation of said redundant amplifier.

- [c6] The system according to claim 1, wherein said first input switch and said second output switch are ganged.
- [c7] A satellite system including an antenna comprising:
 - a payload system generating a plurality of input signals;
 - an amplifier redundancy system comprising a first amplifier receiving at least one of said plurality of input signals from a first input switch when said first input switch is in a through port position,
 - a first output switch in a side port position, wherein said first output switch receives signals from said first amplifier,
 - a second amplifier receiving said at least one of said plurality of input signals from said first input switch through a second input switch and generating amplified signals therefrom,
 - said first input switch in a side port position, wherein said first input switch switches to said through port position in response to a failure in said second amplifier,
 - a second output switch in a through port position, wherein said second output switch switches to a side port position and receives signals through said first output switch in response to said failure in said second amplifier,
 - wherein said second input switch receives said at least one of said plurality of input signals from said first input

switch when said first input switch is in said side port position; and
a controller controlling switching operations of said amplifier redundancy system in response to a determined failure in said second amplifier, said controller receiving signals from said second output switch and operating satellite systems in response thereto.

- [c8] The system according to claim 7 further comprising:
 - a third amplifier receiving signals from a third input switch in a side port position through said second input switch in said side port position; and
 - a third output switch receiving signals from said third amplifier when said third output switch is in a through port position.
- [c9] The system according to claim 8 further comprising a fourth amplifier activated in response to failure of said third amplifier.
- [c10] The system according to claim 7, wherein said payload system comprises a sensor, a controller, a set of upconverters, switches, or a signal generator.
- [c11] The system according to claim 7 further comprising a controller adjusting amplifier drain voltage in response to a degradation in noise power ratio as a function of

operation of said first amplifier.

- [c12] The system according to claim 7, wherein said first input switch and said second output switch are ganged.
- [c13] An amplifier redundancy system comprising:
 - a first amplifier receiving signals from a first input switch when said first input switch is in a through port position;
 - a second amplifier receiving signals from said first input switch through a second input switch and generating amplified signals therefrom,
 - said first input switch in a side port position, wherein said first input switch switches to said through port position in response to a failure in said second amplifier,
 - said second input switch receiving signals from said first input switch when said first input switch is in said side port position and said second input switch is in said side port position; and
 - an output switch in a through port position, wherein said output switch switches to a side port position and receives signals from said first amplifier in response to said failure in said second amplifier.
- [c14] The system according to claim 13 further comprising a controller adjusting amplifier drain voltage in response to a degradation in noise power ratio as a function of operation of said first amplifier.

- [c15] The system according to claim 13, wherein said first input switch and said second output switch are ganged.
- [c16] An amplifier redundancy system comprising:
 - a plurality of amplifiers comprising at least one redundant amplifier;
 - a plurality of input switches, wherein at least one of said plurality of input switches switches from a side port position to a through port position in response to a failure in at least one of said plurality of amplifiers, thereby sending signals through said at least one redundant amplifier; and
 - a plurality of output switches, wherein at least one of said plurality of input switches switches from a through port position to a side port position in response to said failure in said at least one of said plurality of amplifiers, thereby receiving signals from said at least one redundant amplifier.
- [c17] The system according to claim 13 further comprising a controller adjusting amplifier drain voltage in response to a degradation in noise power ratio as a function of operation of said redundant amplifier.
- [c18] The system according to claim 13, wherein members of said plurality of input switches are ganged with members

of said plurality of output switches.

- [c19] A method for operating an amplifier redundancy system comprising:
 - activating an input switch;
 - switching said input switch from a first position to a second position such that signals are directed from a failed amplifier to a first redundant amplifier;
 - activating an output switch; and
 - switching said output switch from a first position corresponding to said input switch second position to a second position corresponding to said input switch first position such that signals are received from said first redundant amplifier.
- [c20] The method of claim 19, wherein activating an input switch further comprises activating said output switch simultaneously therewith.
- [c21] The method of claim 19 further comprising adjusting amplifier drain voltage in response to a degradation in noise power ratio as a function of operation of said redundant amplifier.
- [c22] The method of claim 19 further comprising activating a second redundant amplifier in response to a failure in said first redundant amplifier.

- [c23] A method for operating an amplifier redundancy system comprising:
 - determining a failure in at least one of a plurality of amplifiers;
 - redirecting input from said at least one of said plurality of amplifiers to at least one redundant amplifier through switching one of a plurality of input switches from a side port position to a through port position; and
 - receiving input from said at least one redundant amplifier through at least one of a plurality of output switches through switching said at least one of said plurality of output switches from a through port position to a side port position.
- [c24] The method of claim 23 further comprising adjusting amplifier drain voltage in response to a degradation in noise power ratio as a function of operation of said at least one redundant amplifier.
- [c25] The method of claim 23 further comprising activating a second redundant amplifier in response to a failure in said at least one redundant amplifier.
- [c26] The method of claim 23 further comprising switching said one of said plurality of input switches and said one of said plurality of output switches simultaneously.

[c27] The method of claim 23 further comprising activating an $n \times n-1$ redundancy amplifier.